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Identifying and characterizing business and acceleration cycles of French jobseekers

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Abstract

This paper examines the French jobseeker cycles from January 1997 to March 2015. First, we propose monthly turning point chronologies for the French jobseeker business and acceleration cycles through the non-parametric dating algorithm proposed by Bry and Boschan (1971) and the dating strategy suggested by Proietti (2005). Second, we analyze the main characteristics of these cycles, namely length, depth and shape, that are approximated by their measures of duration, amplitude, and excess, respectively. The chronologies indicate that the jobseekers series is currently in a long expansion phase of the business cycle since February 2008, and in a slowdown phase of the acceleration cycle since September 2014. We observe evidence of asymmetries across the phases of the business cycle in terms of duration and amplitude whereas these measures are rather symmetric for the phases of the acceleration cycle.

Keywords: Jobseekers; Business cycle; Acceleration cycle.

JEL Classification: C22; E32; E24.

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1 Introduction

Over the last decades, France has experienced high and persistent unemployment. Since the mid-eighties, the number of jobseekers has remained over 2 millions. In April 2015, 3.54 million of workers were unemployed in France, its higher level since 1996. French government focuses its efforts on reducing unemployment in order to "invert the curve". Therefore, it seems interesting to examine the cycles of French jobseekers to assess the state of the economy. Business cycle analyzes have proved to be helpful to policy-markers and practitioners in assessing current economic conditions and anticipating upcoming fluctuations.

However, when dealing with economic cycles some confusion appears as regards the definition of those cycles. In the empirical literature on economic cycles, we can distinguish between three kinds of cycles: the business cycle, the growth cycle and the acceleration cycle whose characteristics differ. Basically, the business cycle refers the (log-)level of the series, as defined by Burns and Mitchell (1946). Turning points of the business cycle delimitate periods of recessions (negative growth rate) and expansions (positive growth rate). The business cycle is characterized by strong asymmetries in its phases, concerning for example durations or amplitudes. The growth cycle is the cycle of the deviation to the long-term trend, which can be seen as the potential or tendencial growth. This cycle is sometimes referred to as the output gap. Last, the acceleration cycle is the cycle described by increases and decreases in the growth rate of economic activity. A turning point of this cycle occurs when a local extremum is reached. This cycle is thus a sequence of decelerating and accelerating phases. Such a cycle is very interesting for the short-term analysis of the French economy, not often affected by recessions, because of its high frequency. However, its more pronounced volatility implies a more complex real-time detection.[1]

The aim of this paper is twofold. First, we propose monthly turning point chronologies for the French jobseeker business and acceleration cycles through the non-parametric dating algorithm developed by Bry and Boschan (1971) and the dating strategy proposed by Proietti (2005) from January 1997 to March 2015. Second, as suggested by Harding and Pagan (2002), we analyze the main characteristics of these cycles, namely length, depth and shape, that are approximated by their measures of duration, amplitude, and excess, respectively.

This article is organized as follows. Section 2 briefly describes the data of jobseekers. Section 3 presents the chronologies of business and acceleration cycles, and the characteristics of these cycle are

[1] See, e.g., Anas and Ferrara (2004) and Zarnowitz and Ozyldirim (2006) for a more detailed description of the stylized facts of those various types of cycles.

given in Section 4. Finally, Section 5 concludes.

2 Data

Jobseekers are people who are enrolled at Pole Emploi job center, an organization responsible for providing the public service of employment assistance formed by merging the ANPE (National Employment Agency) and the ASSEDIC network (Association for Employment in Industry and Commerce) in 2008.[2] It is the Pole Emploi's responsibility to support all jobseekers in their search until they find employment, guarantee the payment of benefits to entitled jobseekers, help businesses with their recruitment process and collect their subscription fees.

The concept of jobseekers enrolled at Pole Emploi is a different concept to that of unemployment in the sense of the International Labour Office (ILO), and thus some unemployed are not unemployed in the sense of the ILO, and conversely some unemployed are not enrolled at Pole Emploi. Data on unemployed people are based on administrative records in center jobs whereas they are based on an employment survey for the ILO. The statistics are legal rules: the Pole Emploi centers can accept people according to their availability and their activity.[3]

Pole Emploi publishes monthly statistics of jobseekers following five statistical categories. In our study we focus on the main category, namely the category A that consists on jobseekers required to actively seek employment, unemployed. The data are obtained from Pole Emploi and cover the period January 1996 to March 2015 (see Figure

3 Chronologies of business and acceleration cycles

In this section we propose a monthly chronology of turning points for the French jobseekers business and acceleration cycles. We use the non-parametric dating algorithm proposed by Bry and Boschan (1971). This approach is very simple to handle and has been used in several empirical papers dealing with business-cycle analysis (see, for example, Harding, 2004; Engel et al., 2005; Anas et al., 2007; and

[2]Note that in some countries, the administrative statistics only concern job-seekers who receive unemployment benefits, which is not the case in France, where job-seekers not receiving benefits are also counted.

[3]According to the ILO definition, an unemployed person is a person of working age (i.e. aged 15 years or older) who does not work, not even one hour during the week, who is available to take a job within 15 days and who actively sought a job in the previous month. In each country, a statistical survey is conducted to check whether these criteria are met. In France, INSEE is the national statistical organization responsible for this survey, it publishes it every three months, while Pole Emploi delivers monthly statistics. See Le Barbanchon and Malherbet (2013) for an anatomy of the French labor market.

Darné and Ferrara, 2011).

Assume Y_t is the series of interest (jobseekers), seasonally adjusted and corrected from trading days and outliers. The basic Bry-Boschan algorithm detects a peak at date t if the following condition is verified:

$$\{(\Delta_k Y_t, \ldots, \Delta Y_t) > 0, (\Delta Y_{t+1}, \ldots, \Delta_k Y_{t+k}) < 0\} \tag{1}$$

and detects a trough at date t if the following condition is verified:

$$\{(\Delta_k Y_t, \ldots, \Delta Y_t) < 0, (\Delta Y_{t+1}, \ldots, \Delta_k Y_{t+k}) > 0\}, \tag{2}$$

where the operator Δ_k is defined such as $\Delta_k Y_t = Y_t - Y_{t-k}$. Harding and Pagan (2002) suggest $k = 5$ for monthly data. Generally, turning points within six months of the beginning or end of the series are disregarded. Last, a procedure for ensuring that peaks and troughs alternate is developed, for example by imposing that in the presence of a double through, the lowest value is chosen and that in the presence of a double peak, the highest value is chosen. Censoring rules related to the minimum duration of phases are also imposed in the original algorithm specifying that a phase must last at least six months and that a complete cycle (from peak to peak) must last at least 15 months. In fact, this censoring rule applies for the business cycle because, as noted by the NBER in its seminal definition, a recession must last more than a few months, but there is no reference minimum duration.

In this paper, as we focus on both business and acceleration cycles, we apply the Bry-Boschan algorithm to the series Y_t defined as the monthly jobseekers level and the monthly jobseekers growth rate, respectively. We follow the dating strategy proposed by Proietti (2005) based on three main steps: pre-filtering, which aims at isolating the fluctuations in the series with a period greater than the minimum cycle duration; preliminary identification of turning points via a suitably defined Markov chain that enforces alternation of turning points and minimum duration constraints; final identification of turning points on the original series.

For acceleration cycle, we first filter the jobseekers monthly growth rate series by eliminating the fluctuations with a frequency higher than one year by using a low-pass filter. As low-pass filter, we use the Hodrick-Prescott filter with the appropriate tuning parameter ($\lambda = 13.9$) to eliminate fluctuations with a frequency higher than one year. The fact that the Hodrick-Prescott filter behaves like a low-pass filter has been proved by Gomez (2001) and used by Artis et al. (2004) and Darné and Ferrara (2011). This filtering step is necessary to remove the noise due to short-term fluctuations (see Figure

Estimated dates of turning points since January 1996 until March 2015 are reported in the first and fifth columns of Table

Table 1: Turning points chronologies for business and acceleration cycles.

Turning points	Business cycle	Duration	Amplitude	Excess	Acceleration cycle	Duration	Amplitude	Excess
peak	1997M1				1996M10			
trough					1998M3	16	0.52	0.07
peak					1998M9	7	0.28	-0.02
trough	2001M4	52	837.2	-152.0	2000M10	24	1.46	0.11
peak					2001M10	12	2.22	0.06
trough					2002M8	10	0.42	0.02
peak	2003M10	30	361.1	-1.0	2003M1	5	0.24	-0.01
trough	2004M4	6	55.9	0.9	2004M2	13	0.80	-0.12
peak	2005M3	11	44.7	7.7	2004M8	6	0.45	0.02
trough	2008M2	35	728.4	-9.6	2006M5	21	1.40	-0.06
peak					2009M1	32	3.83	-0.96
trough					2010M10	21	2.62	0.47
peak					2012M9	23	1.08	-0.02
trough					2013M8	11	0.88	-0.04
peak					2014M9	13	0.25	0.04
Average	Contraction	46.5	202.9	4.35	Acceleration	14.0	1.19	-0.89
	Expansion	20.5	540.5	-53.6	Deceleration	16.6	1.16	0.06

Notes: Durations are in months and amplitudes are in points of percentage.

4 Characteristics of the cycles

Three main characteristics are often invoked in order to identify the phases of a cycle, namely the 3D's (duration, depth and diffusion) or, as in Banerji (1999), the 3P's (persistent, pronounced and pervasive). Persistence (or duration) means that the phase must last more than a few months. Generally, starting from the Bry and Boschan (1971) rule, empirical studies consider that a phase of the cycle must last at least five months. A pronounced phase of a cycle is a phase with a sufficient amplitude (depth) from the peak to the trough and conversely. Last, to be recognized as a phase of the cycle, the cycle must be diffused either across the sectors or across the various countries of an economic zone.

Assume that the previous step has produced the same number J of accelerating (expansion) and decelerating (contraction) phases. For $j = 1,\ldots,J$, we note D_j^a and D_j^d the durations in months of the j^{th} accelerating (expansion) and decelerating (contraction) phases, respectively. The amplitude of a descending (contraction) or ascending (expansion) phase is measured by the absolute distance between

the peak and the trough (or the trough and the peak). We note $A_j = |Y_{t_P} - Y_{t_T}|$ the amplitude of a given phase j, where Y_{t_P} is the growth rate (level) at the date of peak and Y_{t_T} is the growth rate (level) at the date of trough. To sum up duration and amplitude of a phase j, an index of severity, noted S_j, is often used. The severity is sometimes referred to as the triangle approximation to the cumulative movements (Harding and Pagan, 2002) and is defined by:

$$S_j = 0.5 \times D_j \times A_j. \tag{3}$$

The severity index measures the area of the triangle with length D_j and height A_j. In fact, the actual measure of cumulative movements, which may be substantially different from S_j in case of departure from linearity, is given by:

$$C_j = \left| \sum_{i}^{D_j} (Y_i - Y_0) \right| - 0.5 \times A_j, \tag{4}$$

where Y_0 is the value of the variable at the date of peak, Y_{t_P}, for a decelerating (contraction) phase or at the date of trough, Y_{t_T}, for an accelerating (expansion) phase. The term $0.5 \times A_j$ removes the bias due to the approximation of a triangle by a sum of rectangles. Consequently, for a given phase j, the difference between the observed growth (level) and a linear growth (level) can be measured by the excess cumulated movements index defined by:

$$E_j = (C_j - S_j)/D_j. \tag{5}$$

This excess index E_j can be seen as a measure of the departure to the linearity for the growth rate (level) of a given phase. The excess index is divided by the duration so that phases can be compared, independently from their duration. A null excess index implies a linear growth (level) within a phase (decreasing or increasing growth, and contraction or expansion), thus a constant acceleration (negative or positive). For a descending phase, a positive excess index means that the loss of growth is greater than it would be with a linear growth and a negative index indicates that the loss is lower. For an increasing phase, a positive excess index means that the gain of growth is greater than it would be with a linear growth and a negative index indicates that the gain is lower. The excess metric is another way to illustrate the shape of cyclical phases. Convex (concave) actual paths are characterized by positive (negative) slopes and positive (negative) measures of excess. In convex expansions and concave recessions, actual paths exhibit gradual changes in the slope at the beginning of the phase, but they become abrupt as the end of the phase comes. By the contrary, in concave expansions and convex recessions, actual paths start the phase of the cycle with steep changes and end the phase smoothly (Camacho et al., 2008).

Business cycle. We first measure those three characteristics on the French jobseekers monthly series, displayed in the first three columns of Table

Again, we observe evidence of asymmetries across the phases of the cycle in terms of amplitude. Average amplitude of an expansion phase is of 540,500 jobseekers and, the average amplitude of a contraction phase is of 202,900 jobseekers.

As regards excess indexes, we note that two out of the three contraction phases possess a negative index implying thus a loss of jobseekers lower than expected with a linear level, and these contractions exhibit concave shape. The other contraction phase in 2004 exhibit a positive index, although close to zero. Concerning the expansion phases, only one phase has a strong positive index, indicating a gain of jobseekers by comparison with a linear level within the phase (in 2004-2005). In terms of the shape of the cycle, this means that these expansions are convex. The first expansion phase presents a strong negative index, indicating a loss of jobseekers by comparison with a linear trend, with concave shape.

Acceleration cycle. We now examine the characteristics on the French jobseekers monthly growth rate series, presented in the last three columns of Table

Average amplitude of acceleration and deceleration phases is almost similar with 1.2 percentage point of growth and, the average amplitude of a deceleration phase is of 0.7 percentage point. Here again, we point out the symmetry of the phases in terms of amplitude.

For excess indexes, we note that one out of the seven decelerating phases possess a positive index (0.47) implying thus a gain of growth by comparison with a linear growth within the phase (in 2009-2010). The others decelerating phases exhibit an index close to zero. Finally, only one accelerating phase has a negative index indicating a loss of growth by comparison with a linear rate. Otherwise, other accelerating phases exhibit an index close to zero.

5 Conclusion

Reducing unemployment is an important objective for the French government due to its high level. This paper examined the French jobseeker cycles from January 1997 to March 2015. First, we proposed monthly turning point chronologies for the French jobseeker business and acceleration cycles through the non-parametric dating algorithm proposed by Bry and Boschan (1971) and the dating strategy suggested by Proietti (2005). Second, we analyzed the main characteristics of these cycles, namely length, depth and shape, that are approximated by their measures of duration, amplitude, and excess, respectively. The

chronologies indicated that the jobseekers series is currently in a long expansion phase of the business cycle since February 2008, and in a slowdown phase of the acceleration cycle since September 2014. We observed evidence of asymmetries across the phases of the business cycle in terms of duration and amplitude whereas these measures are rather symmetric for the phases of the acceleration cycle. These characteristics are important to model the business and acceleration cycles.

Further research would be to compare French jobseeker and unemployment cycles, and the jobseeker cycles in the Euro Area.

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Figure 1: Monthly French jobseekers (1996-2015).

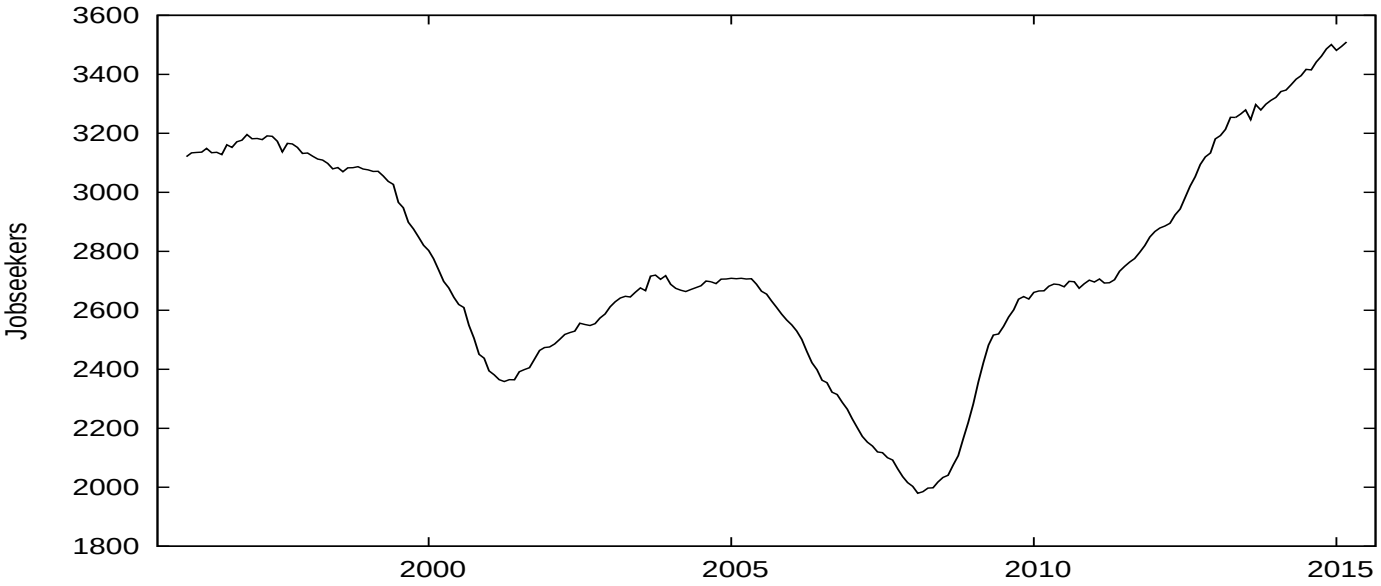

Figure 2: Monthly jobseeker growth rate and smoothed jobseeker growth rate (1996-2015).